REMARKS

STATUS OF CLAIMS

Please cancel Claims 44-84 and enter new Claims 85-122. After entry of this amendment, Claims 85-122 will be pending. Support for these claim amendments can be found throughout the specification and in the claims as originally filed. No new matter has been added.

CLAIM OBJECTIONS

Claims 44 and 78 are objected to because the recitation of "a substrate/surface obtainable by" is deemed not to be a positive recitation. As the aforementioned terms no longer appear in the claim set, this objection no longer applies.

35 U.S.C. §112 REJECTIONS

Claims 44-46, 49-53, 55, 62, 67-68, 70-72 and 74-84 stand rejected under 35 U.S.C. §112, second paragraph as allegedly being indefinite with regard to the terms detailed below.

Claim 44's recitation of "monomer from a monomer source" and "two spatially separated monomer sources" in lines 2-3 and 5-6 respectively. As the aforementioned terms no longer appear in the claim set, this rejection is now moot. Applicants point out that the organic compound present in a plasma prior to polymerization is often referred to as the "monomer" whereas the deposit is often referred to as the "plasma polymer" (see US2006/0252046, e.g., paragraph [0002], last two sentences). For greater clarity, the term "monomer" in the claim set now appears as the phrase "organic compound monomer." Applicants further point out that the organic compound monomer is described in detail in the present application (see US2006/0252046, e.g., paragraphs [0031] to [0050]).

Claim 67's recitation of "the compound" in Claim 67 line 1. In light of the cancellation of Claim 67, this rejection is now moot.

Claim 75's recitation of "ethylene-oxide type monomer." The term "ethylene-oxide type monomer" is described in the specification, e.g., see US2006/0252046, paragraph [0004], wherein the following excerpt has been extracted. "Suitably, the monomers are ethylenically unsaturated. Thus the functional group compound maybe unsaturated carboxylic acid, alcohol or amine, for example, whilst the hydrocarbon is suitably an alkene. By plasma polymerization, it is also possible to deposit **ethylene-oxide type molecules** (e.g., tetraethyleneglycol mooallyl ether) to form 'non-fouling' surfaces" (emphasis added). Nonetheless, to expedite prosecution, the term "ethylene-oxide type monomer" no longer appears in the claim set. Rather, "tetraethyleneglycol monoallyl ether" now appears in the claim set. As noted above, "tetraethyleneglycol monoallyl ether" is representative of the ethylene-oxide type molecules referred to in the excerpt reproduced above.

Claim 78's recitation of "non-uniform plasma polymer surface." The term "non-uniform" is described in the specification, e.g., see US2006/0252046, paragraph [0014], reproduced as follows. "Non-uniform refers to surfaces which have a **heterogeneous chemical and/or physical structure**" (emphasis added). Non-uniform surfaces of the present invention are further described and contrasted with uniform plasma polymerized surfaces previously described in WO01/31339. For example, see US2006/0252046, paragraphs [0008] to [0010], reproduced below for the reader's convenience (emphasis added).

> [0008] The technique disclosed in WO01/31339, although effective with respect to providing **uniform plasma polymerised surfaces** to which biomolecules bind with specificity and affinity, is **not sufficiently versatile to provide a surface which has diverse chemical or physical properties**.
>
> [0009] We herein disclose a method we refer to as "plasma writing" which provides **surfaces that are characterised by chemical and structural micropatterns or gradients extending, typically into three dimensions**, wherein the X-Y plane is defined by the surface, and the Z-direction is substantially perpendicular thereto. The method creates **both chemical and molecular architectures on a surface, to**

> **give rise to two or three-dimensional patterns, without the need to prefabricate masks or stencils**, as described in Dai et al., Journal of Physical Chemistry B 101:9548-54 (1997) and **without limitation in the number or type of different architectures created on a single surface as part of the same process**.
>
> [0010] There is a requirement to provide **non-uniform plasma polymer surfaces which have been adapted to provide complex heterochemical surfaces** to which biological entities can differentially bind.

In light of the aforementioned excerpts from the specification, Applicants believe that the term "non-uniform" clearly refers to **heterogeneous chemical and/or physical structure**. Nonetheless, to expedite prosecution, the term "non-uniform" has been further elaborated and now appears in the claim set as the phrase "non-uniform characteristics selected from the group consisting of being heterogenous chemically, heterogeneous physically or combinations thereof."

Claim 80's recitation of "assay product." In light of the cancellation of Claim 80, this rejection is now moot.

In view of the aforementioned remarks, Applicants respectfully request withdrawal of the aforementioned rejections under 35 U.S.C. §112, second paragraph.

35 U.S.C. §102 REJECTIONS

Claims 44, 45-46 and 49 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Goessl et al. (Plasma Lithography – thin-film patterning of polymers by RF plasma polymerization II: Study of differential binding using adsorption probes," *J Biomater Sci Polymer Edn*, 12(7):739-753 (2001)).

Claims 44, 45-46 and 49 which were product-by-process claims have been cancelled. The newly added claims are directed to **methods**. Specifically, methods for preparing a heterogeneous

binding surface which employ plasma polymerization to produce a plasma polymer deposit that is heterogeneous chemically and/or physically followed by coating with a binding entity.

In contrast, Goessl et al. describe a micropatterned cell substrate produced by a two-step process that employs photolithography in addition to plasma polymerization followed by coating with affinity structures for specific cell binding. More specifically, the first step of Goessl et al. entail the deposition of tetraglyme polymer by plasma polymerization wherein the overall thickness of the resulting film, as measured by ellispometry, was ~120 nm (see Goessl et al., page 743, first paragraph, last two sentences). Nowhere does Goessl et al. disclose or suggest that the resultant plasma polymer deposit is heterogeneous chemically and/or physically. Rather, Goessl et al. employ a second step that entails a positive photolithographical process to produce a micropatterned substrate that is subsequently coated with a binding entity (see Goessl et al., page 743, first full paragraph, first sentence). As the photolithographical step taught by Goessl et al. produces the micropatterned substrate, one of skill in the art would not be motivated to eliminate the photolithographical process and modify the plasma polymerization step of Goessl et al. to produce a plasma polymer deposit that is heterogeneous chemically and/or physically.

Claim 78 stands rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Goessl et al. (Plasma Lithography – thin-film patterning of polymers by RF plasma polymerization II: Study of differential binding using adsorption probes," *J Biomater Sci Polymer Edn*, 12(7):739-753 (2001)). Likewise, **Claim 78** stands rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Kanbe et al. (US 6,733,868). As the subject matter of Claim 78 has been cancelled, this 35 U.S.C. §102(b) rejection is now moot.

In view of the aforementioned remarks, Applicants respectfully request withdrawal of these rejections under 35 U.S.C. §102(b).

35 U.S.C. §103 REJECTION

Claims 44-46, 49-53, 55, 62, 67-68, 70-72 and 76-84 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Kanbe et al. (US 6,733,868) in view of Haddow et al. (WO 03/035850) and Uhrich et al. (US2003/0104614).

Claims 44-46, 49-53, 55, 62, 67-68, 70-72 and 76-84 have been cancelled. As noted above, the newly added claims are directed to **methods**. Specifically, methods for preparing a heterogenous binding surface which employs plasma polymerization to produce a plasma polymer deposit that is heterogeneous chemically and/or physically followed by coating with a binding entity.

In contrast to the presently claimed invention which employs plasma polymerization to produce a plasma polymer deposit that is heterogeneous chemically and/or physically, Kanbe et al. prepare a patterned substrate using i) a mask formation step, ii) a plasma irradiation step, and iii) a surface modification step (see Kanbe et al., Embodiment 4, column 13, line 64 to column 15, line 22). As the masking step followed by the plasma irradiation step of Kanbe et al. produces a patterned surface, one of skill in the art would not be motivated to eliminate the masking step and modify the plasma irradiation step to produce a heterogeneous binding surface as presently claimed. Furthermore, as noted Kanbe et al. fail to teach binding of biomolecules (Office Action mailed November 3, 2008, page 8, 2nd full paragraph).

Haddow et al. relate to a substrate which has a coating produced by plasma polymerization that is suitable for cell culture. Although Haddow et al. state "by plasma polymerization, it is also possible to deposit a range of other types of surfaces" (see Haddow et al., page 4, lines 18-19), there is no disclosure or suggestion of employing plasma polymerization for preparing a plasma polymer deposit that is **heterogeneous chemically and/or physically** as required by the presently claimed invention. Moreover, Haddow et al. fail to disclose or suggest moving the source of plasma and/or the substrate relative to one another during plasma polymerization such

that at least part of the substrate has a plasma polymer deposit that is **heterogeneous chemically and/or physically**.

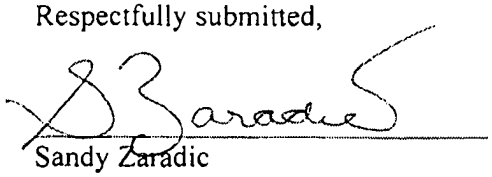
Uhrich et al. relates to polymeric patterned surfaces for cell culture prepared by stamping polymers (see Uhrich et al., page 8-9, Examples 1-5). Uhrich et al. fails to cure the insufficiencies of Kanbe et al. and/or Haddow et al. with regard to the presently claimed invention.

Applicants contend that none of the aforementioned references alone or in combination would lead one of skill in the art to the presently claimed invention which provides methods for preparing a heterogeneous binding surface comprising a plasma polymer deposit that is heterogenous chemically and/or physically by moving at least one of: (i) the source of plasma, and (ii) the substrate, relative to one another during plasma polymer deposition. In view of the aforementioned remarks, Applicants respectfully request withdrawal of these rejections under 35 U.S.C. §103.

CONCLUSION

Applicants believe Claims 85-122 are in condition for allowance and respectfully request the same. If there are any questions or if additional information is required, the Examiner is respectfully requested to contact Applicants' attorney at the number listed below.

Respectfully submitted,



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